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EXAMINER	
FITZPATRICK, ATIBA O	

ART UNIT	PAPER NUMBER
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/563,921	VAN DE HAAR ET AL.	
	Examiner	Art Unit	
	ATIBA O. FITZPATRICK	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 November 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

In response to Applicant's arguments pertaining to the 35 USC 101 and 112 second paragraph rejections, the rejections are withdrawn in light of the amendments.

In response to Applicant's arguments for the 35 USC 102 and 103 rejections, Applicant is advised that the excerpts taken from Bruijns and included in pages 11 and 12 of Applicant's remarks are preferred embodiments and do not demarcate or encompass the overall limitations of Bruijns' invention. Applicant is referred to column 3, line 64 – column 4, line 9, which reads:

Vignetting phenomena have often the property that the associated attenuation coefficients vary along lines in the image and that said variation is substantially the same along each parallel line in the image. Then compensation for vignetting is achieved by multiplying pixel-values pertaining to a perturbed image by a first correction factor and by a second correction factor. Said first correction factor acts as to compensate for vignetting along a central line in the x-ray image on which a pixel at issue lies; said second correction factor acts as to compensate for differences in the vignetting along lines parallel to the central line from vignetting along said central line.

This is understood as stating that the pixels in the image (or the image itself) is multiplied by the first correction factor and then the pixels are also multiplied by the second correction factor. The different vignetting described to be corresponding to the different correction factors are understood to be coming from different sources of structured noise. That is, the different manner in which the vignetting varies in the image

is understood to be structural in the sense that structure is understood to connote the make-up of the image. This excerpt does not say that the correction factors are combined prior to applying them to the pixels. Lines 11-65 of column 2 indicate that correction factors pertain to a corrective image. These corrective factors are determined by calculating the reciprocal of the attenuation coefficient for the pixels of the image. The attenuation coefficients are obtained by making an image of an object that has a spatially homogeneous bright distribution. Note that the abstract and summary sections of Bruijns clearly indicate that the correction factors are gain characteristics. Therefore, applying a corrective factor to an image results in a gain corrected image. Note that this reads directly on the independent claims in question, and no limitations present in the independent claims necessitate an interpretation that obviates the forgoing remarks.

Analogous arguments are made for rejection all independent claims. Applicant argues that the depending claims are allowable since the independent claims are alleged to be allowable, but this assertion is obviated with the office's foregoing arguments.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 3, 4, and 6-9 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 5434902 (Bruijns).

As per claim 1, Bruijns teaches an imaging arranged to reduce an artifact in a three-dimensional reconstructed volume comprising a plurality of planar images, said imaging system comprising **(Limitations present only within the preamble are not given patentable weight)**

an image artifact reducer arranged to process said planar images with a first corrective image for eliminating a first source of structured noise in said images, therby producing a gain corrected image, and arranged to apply a second corrective image to the gain corrected image for eliminating a second source of structured noise in said images **(Bruijns: abstract: "correction factors for all pixels… image of an object having a spatially homogeneous brightness distribution… Various gain characteristics can be stored so that vignetting is compensated for even when the adjustments of the imaging system are varied… the vignetting effects in either of the sub -images are inevitably different due to the use of a beam splitter… The vignetting is decomposed into vignetting effects in a horizontal and in a vertical direction in the recombined image. Correction for vignetting is achieved by multiplying decomposition factors pertaining to horizontal and to vertical vignetting"; col 2, lines 11-29; col 2, lines 47-64; col 4, lines 1-9; col 5, line 67 – col 6, line 29; Figs. 2-4)**.

As per claim 2, arguments made in rejecting claim 1 are analogous to arguments for rejecting claim 2.

As per claim 3, Bruijns teaches the imaging system according to Claim 2, wherein:
the first gain correction data comprises a result of an averaging of a plurality of raw images of a gain calibration scan;
the second gain correction data comprises a result of an averaging of a plurality of raw images of the gain calibration scan after the plurality of raw images of the gain calibration scan is processed utilizing the first corrective image and an unwarping function is applied to the processed first corrective image **(Bruijns: Fig. 4: particularly, but not limited to, 28-33, 40-47, and 50-53; col 4, lines 1-9; col 4, lines 43-62; col 5, lines 11-19; col 6, lines 1-29; Figs. 2 and 3; Figs. 1 and 4: 29; col 2, lines 54-64: col 3, lines 1- 26: "low pass filter"; Also, see arguments presented for claim 1)**.

As per claim 4, Bruijns teaches the imaging system according to claim 1, the image being acquired by means of an image intensifier, wherein the first source of noise comprises a noise of an output screen of the image intensifier and the second source of noise comprises a noise of an input screen of the image intensifier **(Bruijns: col 5, lines 50-63: "In medical x-ray radiography various further origins of vignetting in an x-ray image are known, e.g. variations in intensity in an x-ray beam emitted by an x-ray source, the geometry of the x-ray detection screen, e.g. an input screen of an x-ray image intensifier or the substantially cylindrical shape of a patient to**

be examined. The vignetting of the x-ray image is transferred to a visible image when the x-ray image is transformed into a visible image, e.g. by an x-ray image intensifier. Such image perturbations are compensated by an imaging system in accordance with the invention to the accompanying drawings"; col 5, lines 42-66; Figs. 1 and 4: 6 and 7).

As per claim 6, arguments made in rejecting claims 1 or 4 are analogous to arguments for rejecting claim 6.

As per claim 7, arguments made in rejecting claim 1 are analogous to arguments for rejecting claim 7.

As per claim 8, arguments made in rejecting claim 1 are analogous to arguments for rejecting claim 8. Bruijns further teaches after being processed by an unwarping function **(Bruijns: col 4, lines 1-9; col 4, lines 43-62; col 5, lines 11-19; col 6, lines 1-29; Figs. 2 and 3; Figs. 1 and 4: 29)**.

As per claim 9, arguments made in rejecting claims 2 and 3 are analogous to arguments for rejecting claim 9.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5434902 (Bruijns) as applied to claims 4 and 1 above, and further in view of USPN 5748768 (Silver).

As per claim 5, Bruijns teaches the imaging system according to Claim 4, wherein the first corrective image comprises a drift correction data arranged to correct for a movement of a projection of the output screen of the image intensifier **(Bruijns: col 5, lines 42-66: "For improving spatial resolution, the use of a beam splitter and two optoelectronic sensors has been proposed in the cited reference... Hence, a complete image is divided into two sub-images that are mutually shifted over half a distance between two adjacent pixels in either of the sub-images. Subsequently, both sub-images are recombined, so that a full image results which has an improved spatial resolution"; abstract: "When, in order to improve spatial resolution, the image formed on the output screen of an image intensifier in an x-ray examination apparatus is split into two sub -images which are subsequently recombined, the vignetting effects in either of the sub -images are inevitably different due to the use of a beam splitter"; col 6, lines 30-49)**.

Bruijns does not teach during a rotational scan.

Silver teaches during a rotational scan **(Silver: col 4, lines 45-64; abstract: "correct offsets…CT"; col 9, line 25 – col 10, line 4: "The present invention as illustrated and described herein, in accordance with the first embodiment, makes corrections for both horizontal and vertical distortions in an image frame, as can occur in CT imaging systems using either a rotating table (i.e., a turntable) configuration or a rotating gantry configuration… rotating gantry… With either the first or second embodiment, many frames (preferably about 100) can be collected at measuring positions and averaged to improve the signal to noise ratio")**.

Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Silver into Bruijns since Bruijns suggests a system for correcting artifacts in x-ray images wherein an offset is corrected in general and Silver suggests the beneficial use of a system for correcting artifacts in x-ray images wherein an offset is corrected during a rotational scan as to " make[s] corrections for both horizontal and vertical distortions in an image frame, as can occur in CT imaging systems using either a rotating table (i.e., a turntable) configuration or a rotating gantry configuration" (Silver: col 9, lines 25-40) in the analogous art of image processing.

As per claim 10, Bruijns teaches a computer program (40) **(Bruijns: Fig. 4: 44 and 50)** and the steps of the method according to claim 1 **(See arguments made for claim 1)**.

Bruijns does not teach arranged to carry out the steps.

Silver teaches arranged to carry out the steps **(Silver: Fig. 2: 19-33; col 7, lines 6-20: "computer 19 which includes CPU 22, data storage device 23, and memory device 25; and display 24. Memory device 25 stores software subprograms for retrieval and execution by CPU 22, designated as a coordinate locator 27, a curve fitter 29, and a coefficient curve fitter 31")**.

Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to implement the teachings of Silver into Bruijns since Bruijns suggests a system for correcting artifacts in x-ray images in general and Silver suggests the beneficial use of a system for correcting artifacts in x-ray images wherein steps are implemented in software in the analogous art of image processing. It would have bee obvious for one of ordinary skill in the art at the time of the invention to decide to implement the teachings in software for the benefit of lower cost and greater ease in distributing the system to various locations as well as system maintenance. Furthermore, one of ordinary skill in the art at the time the invention was made could have combined the elements as claimed by known methods and, in combination, each

component functions the same as it does separately. One of ordinary skill in the art at the time the invention was made would have recognized that the results of the combination would be predictable.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Atiba Fitzpatrick whose telephone number is (571) 270-5255. The examiner can normally be reached on M-F 10:00am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571)272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Atiba Fitzpatrick

Patent Examiner

/Samir A. Ahmed/

Supervisory Patent Examiner, Art Unit 2624